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The present invention relates to a safety device against inundation for an electrical household appliance, in particular for a winding machine.

It is known that within the range of machines to the washing the general risk of an inundation of the spaces exists due to an unexpected leakage of the supply or of the deriving system of the washing liquid. The causes for such unexpected leakages know z. B. by troubles of the devices inside the machine (solenoid valve or pressure monitor of the supply) or by ruptures of the supply and deriving pipes for the washing liquid caused become.

For this purpose devices are known against inundation, which make an almost continuous control of eventual leakages.

Generally these devices plan in or several solenoid valves, which are arranged at the beginning of a water supply line, and a suitable sensor (a float or a waterless sponge) to exhibit, which is in a water catchment basin positioned, which is provided underneath the Wasserbeckens of the machine. If the devices exhibit malfunctions inside the machine, the water flows into this catchment basin and the caused sensor thereupon to operate an electric breaker which supplies a suitable electric signal to the solenoid valve mentioned, so that this closes.

There is also devices of the mentioned type known, which plan an outer tube, which encloses the water supply line. If the water supply line exhibits ruptures or tears, the possible outer tube that the liquid outgoing from the supply pipe becomes passed into the catchment basin, which would cause otherwise an inundation, whereby closing of the safety valve becomes introduced.

Devices of the known type exhibit some problems, which become to a large extent explained in the course of the present description and which against an use of these devices to speak, because the devices of the known type - due to the instantaneous embodiment - exhibit a certain drawback concerning the housing or the solenoid valves and with high costs connected are. .

Object of the instant invention is it to solve above mentioned problems of the devices of the known type and to point a safety device out against inundation, which, compared to the known devices, exhibits lower costs and smaller dimensions.

These objects become according to the present invention by a safety device against inundation and by a corresponding manufacturing method achieved, which the features of the lying close claims exhibit.

The features and the advantages of the instant invention come out clearer from the subsequent detailed description and from the accompanying designs, which as explanatory and not when limitative example shown become.

In the designs show:

Fig. 1 a plan view on a safety device against inundation of the known type;

Fig. 2 a longitudinal section by the device in accordance with Fig. 1 along the line CC;

Fig. 3 a plan view on a safety device against inundation according to the present invention;

Fig. 4 a longitudinal section by the device in accordance with Fig. 3 along the line A-A;

Fig. 5 a certain part of Fig. 4;

Fig. 6 an enlargement of a part of Fig. 4;

Fig. 7 a longitudinal section by a safety device against inundation according to the present invention in a first embodiment;

Fig. 8 an enlargement of a part of Fig. 7;

Fig. 9 a longitudinal section by a safety device against inundation according to the present invention in a second embodiment; and

Fig. 10 an enlargement of a part of Fig. 9.

Into the Fig. 1 and 2 is a safety device against inundation of the known type in its entirety with 1 designated.

The valve housing, existing from thermoplastic material, is with 2 indicated and exhibits a passage line 3, supplied by which the water of a machine becomes the washing. Into this conduit 3 two solenoid valves are 4 and 5 connected in series.

The solenoid valves 4 and 5 are from that known type and operation (concerning a detailed description of this type

from solenoid valves z becomes. B. on the Italian patent application No. AL92A000003, filed of the same applicant, referred to).

Here it is to be indicated sufficient that each solenoid valve exhibits electromagnets, to the one induction coil and/or a coil 6 contains, existing from an electric conductive wire, which is 7 wound on a bobbin, and with a magnetic yoke 8 is provided. The ends of the induction coil are electric connected over two terminals with a Stromzuführungskabel, those in Fig. 1 not indicated are (in the accompanying designs became - to the simplification of the illustration - the reference numerals of the components of the two solenoid valves only in one of both shown).

With the reference numeral 9 is the closure means in its entirety indicated, which becomes set by means of a movable armature or core 10 in movement, which in an housing 11 is. The housing 11 exhibits to a threaded portion, which into an open is screwed in thread, which is into the valve housing 2 introduced.

If the electromagnet becomes 6-8 dense fed over the electrical connections, the closure device becomes 9, by the movable core 10, held of a spring 12 in a rest position, which does not permit the flow of the liquid into the conduit 3. If the electromagnet becomes 6-8 fed, against it the core 10 caused will shift in such a way that it takes up the reaction force of the spring 12. In this case the device 9, the bottom pressure of the liquid standing, a working position, can take which permits a flowing through of the liquid river in the conduit 3.

The electromagnet 6-8 is enclosed by a protective coat 13, which is by spraying a thermoplastic material on applied and into the housing 11 introduced.

In the upper portion of the valve housing 2 an union nut is 14 mounted, in order to be able to attach the device 1 with corresponding seal 15 to a tap. In the upper portion of the conduit 3, upstream to the solenoid valves 4 and 5, are a filter 16 and a passage automatic controller 17 provided.

In correspondence to the output of the conduit 3 is a rubber hose 18 provided, which is on the outer end of the valve housing 2 grafted and on this with a folded metal ring 19 secured.

With 20 an outside folded hose is designated, which encloses the hose 18 and which has object, if the hose is 18 brittle, to take up the running out water. Further the tube 20 encloses an electric cable 21, whose conduits at the already mentioned terminals of the solenoid valves are 4 and 5 connected.

With 22 min -22 min min is an envelope of the electromagnets 6-8 designated, with 23 is an outside protective sheath indicated, which encloses the valve housing 2 and also the object has to fix the folding hose 20. The protective sheath 23 guaranteed not only a mechanical protection, but it represents also an aesthetic envelope appropriate to the household appliances. The bottom end of the device 1 and its entire operation are actual known and become not described therefore here.

The envelope of the electromagnets 6-8 becomes for ordinary manufactured, as resin becomes 22 min into a container 22 min min from squirted plastic poured.

The production of this envelope 22 min -22 min min is very expensive, since first the container 22 min min must become partial injected, then with resin 22 min filled subsequent on the electromagnets 6-8 up-inverted and.

Generally the used resin 22 min is by far more expensive than thermoplastic material and required relative prolonged hardening times; this the impaired convenience and the handling of the part.

The protective sheath 23 becomes also from two half shells formed, which are often different and which become connected with one another in the injection moulding from partially thermoplastic material manufactured and subsequent by means of screws (more visible in 24), if the valve housing 2 and at this connected elements are inserted.

As one can determine, the protective sheath is 23, which becomes used with the known safety devices against inundation, therefore generally very bulky and takes much place in claim. This is z. B. with the use of the devices against inundations in installation kitchens hinderlich, become so incorporated with which the household appliances that they need little place. In addition the jacket presupposes 23 assembly works, which continue to increase the costs of the device.

From the before described it follows clearer why the coat system and the protection system of the electromagnets of the devices are expensive against inundation known type much place in claim to take and with the production, with itself the effects on the price of the final product, resultant from it.

Like stated, the instant invention the object is the basis, drawbacks above mentioned will nevertheless avoid, by indicating a safety device against inundation as smaller dimensions, by lower costs the realized can and the desired aesthetic requirements and the requirements to the electrical insulation and to the insulation against moisture guaranteed.

According to the invention will is sprayed on this achieved, by the expensive and much place of needing elements 22 min, 22 min min and 23 known type by a single layer from thermoplastic material replaced to become, that direct on the valve housing, became fixed at which the solenoid valves before.

For this purpose becomes in the Fig. 3, 4, 5 and 6 a safety device against inundation shown, which is realized after the teaching of the instant invention.

In all figs the same numerals for the designation of technical equivalent elements become used with addition by the letters A, B, and C, respective for the embodiments, those in the Fig. 3-6, 7-8, 9-10 shown are (also in the figs, which represent the instant invention, the reference numerals of the components of the two solenoid valves are only on one of the two transmitted).

As from the Fig. , the safety device 1A consists 4 and 6 apparent against inundation of a valve housing 2A, on which two solenoid valves are 4A and ä mounted. The basic execution of the housing 2A and the solenoid valves 4A and ä

is basic similar regarding the Fig. 1 and 2 described. One should note however that in the figs, which represent the instant invention the electromagnets compared with those in Fig. 2 around 90 DEG rotated are: this to the purpose, in order to thus reduce the width of the device, their lateral space requirement.

As apparent is, the basic difference of the device exists in accordance with the known type in the fact that the electromagnets 6A-8A direct of a protection and an insulating body are 30 surrounded from thermoplastic material, whatever at least partly covers the housing 2A.

In this way the use of the elements becomes 22 min, 22 min min and 23 of the known type avoided.

In the case of the instant invention the housing is 2A at the upper and undersides with corresponding fixing members in the form of approaches 31 and 32, as from Fig. 6 apparent, provide. These approaches 31 and 32 have the object to guarantee a good rebate of the thermoplastic material which forms the body 30, which is sprayed on on the housing 2A and on the electromagnets.

In addition the toothed form of the fixing elements 31 and 32, those the contact surface with the thermoplastic material enlarged, has the important object to define together with the K<sub>o</sub> 30, a wavy path against the moisture which could possibly penetrate to the electromagnets. Thus the elements have 31 and 32, combined with the body 30, also the important function to guarantee a perfect tightness against the penetration of water and moisture from the outside toward the electrical contacts, without the use from special sealing materials.

Um die Dichtigkeit für die Aufgaben der Erfindung weiter zu verbessern, wird der Körper 30 vorzugsweise aus thermoplastischem Material hergestellt, welches sich während der Aushärtphase leicht zusammenzieht, die dem Aufspritzen (von z. B. Polypropylene) folgen.

In Fig. 4 illustrated embodiment is the innertube 18A at the bottom end of the valve housing 2A with a folded metal element 19A fixed. The outside folded hose 20A becomes 33 fixed against it at the sprayed on housing 30 by means of an hollow cylinder body. This element 33, apparent from Fig. 5, consists of two half shells of sprayed on thermoplastic material, which are connected resting.

Like apparent, the element exhibits 33 teeth and hooks 35 seizing on the folding hose 20A, with the corresponding seats the 36, which are worked out from the sprayed on body 30, is connected. As from Fig. 4 apparent is, covers the sprayed on thermoplastic material, which forms the body 30, except the valve housing 2A and the electromagnet 6A-8A also the electric cable 21A and the supply lines of the solenoid valves, which are with 37 designated, whereby they are electrically isolated. Like apparent, the terminal ends 37 run due to the position of the electromagnets opposite rotated in the comparison to the known positioning. This trick leads, as one also from the comparison of Fig. 1 with Fig. 3 to infer can do, to a reduction of the lateral dimensions of the device.

The fact that the coating material of the opening is 21A for ordinary elastic, proves as favourable, there the easy compression of this coat, which results during the spraying on procedure of the thermoplastic material 30, to an optimum connection of the two parts leads and thus later penetration of moisture prevented.

From the before described one and from the designs clearer, like the device according to the present invention smaller dimensions comes out exhibits and lower costs caused compared with a similar device in accordance with the known type. Indeed become with a single element, which exhibits low manufacturing costs caused and compact dimensions (body 30), the robustness of the structure, the electric and hygroscopic insulation and the outer coating secured, and this element has thereby also still another aesthetic importance.

The advantages of the invention result also clear from the aspect of the production of the device in accordance with Fig. 4, as subsequent described becomes.

On the valve housing 2A, which becomes essentially as obtained as in the case of the known type, become into that if necessary, intended seats of closure members 9A fixed and the bodies 11A screwed, which takes up the movable cores 10A of the solenoid valves 4A and  $\ddot{a}$ .

Into the housings 11A the subsequent electromagnets 6A-8A with the corresponding power cable 21A, which is 37 connected to the terminals, become introduced.

So obtained part becomes inserted into a suitable injection moulding. Into this injection moulding then the thermoplastic material becomes injected, which forms the coat body 30.

Favourable way is the injection moulding so formed that it part by means of the ends of the housing the 2A (D. h. by the parts or the conduits of the housing 2A as or the drain of the liquid) regards central, so that the injected thermoplastic material the housing 2A can cover for uniform.

Like apparent, one receives thus the body 30 by a simple operation, to spraying on thermoplastic material on the valve housing 2A and on with this connected elements. The housing 2A becomes thus - with exception of the supply and drain lines for the liquid - complete 30 covered, continuous and uniform without holes or interconnections, of the body.

At the end of the hardening phase of the sprayed on thermoplastic material, which lasts generally only few seconds, that can become part immediately of the form taken out and for the attachment of the hoses 18A and 20A to the housing 2A in the described above way and for the attachment of the elements 14A-17A processed (in addition, the elements 14A-17A could become before spraying on fixed).

Therefore it is obvious that the production of the device is favourable according to the invention in the comparison to the known type. Because apart from the use of a single economic element (body 30), the four expensive parts known type replaced (resin 22 min, container 22 min min, envelope 23, screws 24), the whole in a single operation of short duration becomes realized, which also the nearly immediate processing of the part plans, without any type manual assembly, around the insulation and the coat of the electromagnets obtained.

Into the Fig. 7 and 8 a first possible variant of the device, the subject-matter of the instant invention becomes is,

shown. Like already before mentioned, will in these figs the same reference numerals as in the preceding figs used, in order to indicate to the before indicated elements the technical equivalent elements, together with the letter "B".

The device 1B of the Fig. the Fig differs 7 and 8 from that, by the fact 3-6 that the connection between the innertube becomes 18B and the housing 2B without the use of the crease element (19 and 19A) of the preceding figures secured.

In conformity with this variant the sprayed on body 30B points - as from Fig. 8 apparent - an extension 40 up, those the end of the hose 18B, which is with the housing 2B connected, enveloped. This extension 40 can replace thus the crease element mentioned (19, 19A), so that the production of the device according to the invention becomes further simplified.

It is obvious that with this embodiment the valve housing becomes 2B for spraying the body 30B on into the corresponding injection moulding introduced, if it is already with the hose 18B connected.

Into the Fig. 9 and 10 a second possible variant of the device, the subject-matter of the instant invention becomes is, shown. In these figs will the same reference numerals as in the preceding figures used, in order to indicate technical equivalent elements, but in connection as the letter "C".

The device 1K of the Fig. it differs 9 and 10 from the preceding figures by the fact that the connection between the outside folded hose 20C and the valve housing 2C without the use of the cylindrical member is 33 secured.

In conformity with this variant the sprayed on body 30C points - as from Fig. 10 apparent - an extension 50 up, those the end of the folded hose 20C, which is with the housing 2C connected, covers. This extension 50 can replace thus the cylindrical member 33.

In addition in conformity with this variant a resilient seal is 60 provided, which is adhesive between the housing 2C and the hose 20A inserted, in order to be able to accomplish the injection of the thermoplastic material without risk of penetration, which can be sprayed on, into the folded hose 20C.

It is obvious that with this embodiment the valve housing becomes 2B for spraying the body 30B on into the corresponding injection moulding introduced, if it is provided already with the hose 20C connected and with the seal mentioned 60.

From the present description follow the features of the instant invention as well as their advantages clearer.

From the before described follows indeed clearer, how the safety device is against inundation according to the present invention compared with the known devices by far lower costs caused and many more space-saving and how its production is simplified compared with the known type. To increase and this due to the fact that a single component from sprayed on plastic material reduced dimensions is capable to carry out the necessary electric and hygroscopic insulation the structural robustness of the device and carry out an outer envelope, which corresponds to also aesthetic requirements.

The using the apparatus according to the invention proves thus particularly favourably with winding machines for installation kitchens, with which these machines as space-saving as possible incorporated to become to be supposed. In addition the low costs of the present device the extended use of the devices promote themselves against inundation with a higher safety resultant from it.

Other in addition advantage suggested solution exists therein that the protective coating (30, 30B, 30C), thus that it from a single material instead of from three various (container 22 min min, resin 22 min, outer shell 23) manufactured is, at the end of the life of the device many more efficiently disposed will can. For this purpose also the identification of the used material (a single instead of three as with the known type) is the corresponding particular regulations simpler.

It is obvious that are possible for the person skilled in the art numerous variants of the device described as example, without it must leave the novelty range of the inventive idea.

For the example the two solenoid valves, with which the device is according to the invention provided, can do electric in series or however parallel connected its. In case of in row circuit the electromagnets would be natural so dimensioned that each single with a voltage halved in the comparison to the main voltage can function.

It is also obvious that the basic concept of the invention is more applicable also with safety devices against inundation with egg single solenoid valve direct.